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(54) Title: NOVEL FORMS OF T CELL COSTIMULATORY PROTEINS, NUCLEIC ACID MOLECULES, AND USES THEREOF

(57) Abstract

The present invention relates to B7 proteins; to B7 nucleic acid molecules, including those that encode such B7 proteins; to antibodies raised against such B7 proteins; and to therapeutic compounds that regulate B7 function. The present invention also includes methods to identify and obtain such proteins, nucleic acid molecules, antibodies, and inhibitory compounds. Also included in the present invention are therapeutic compositions comprising such proteins, nucleic acid molecules, antibodies and/or inhibitory compounds as well as the use of such therapeutic compositions to regulate an immune response in an animal.

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INTERNATIONAL SEARCH REPORT

Inter[illegible] Application No
PCT/[illegible] 99/06187

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C12N15/12 C07K14/705 C12N15/86 C12N5/10 A61K49/00
C07K16/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X 1-14	EMBL accession number U57755, entity g2065520, T-cell specific surface glycoprotein B7-1 mRNA XP002107312 cited in the application see the whole document	
X	& HASH, S.M.: THESIS, VETERINARY PATHOLOGY, 1996, TEXAS A & M, cited in the application	1

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[X] Further documents are listed in the continuation of box C.

[ ] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search	Date of mailing of the international search report
25 June 1999	03. 11. 1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	CHAMBONNET, F

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inter[redacted]al Application No
PC[redacted]S 99/06187

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	YANG, S. ET AL.: "Cloning of genes encoding canine co-stimulatory molecules" FASEB JOURNAL FOR EXPERIMENTAL BIOLOGY, vol. 12, no. 5, 20 March 1998, BETHESDA, MD US, page a940 XP002107311 see the whole document	1-14
O,P, X	& Annual Meeting of the Professionnal resear ch scientists on experimental biology 98, part II USA,	1-14
998		

1

INTERNATIONAL SEARCH REPORT

Ir[redacted]nal application No.
PCT/US 99/06187

Box I Obs rvations where certain claims were found unsear hable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Remark: Although claim 7 is directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. [ ] Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [X] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

see FURTHER INFORMATION sheet, subject 1.

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: Partially 1-14 16-20 22 23 25-31 33-39

An isolated nucleic acid molecule having a nucleic acid sequence that is at least about 80% identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5 or a fragment thereof having at least about 12 nucleotides; a complement thereof; a canine B7-1 protein encoded by said sequence, a therapeutic composition comprising it,a method to produce a canine B7-1 protein ; a method to identify a compound capable of regulating T cell immune response in an animal using said protein; recombinant molecule, virus or cell comprising said nucleic acid molecule;, an isolated antibody that selectively binds to said protein.

2. Claims: 21, 32 and partially 1-14 16-20 23 25-31 35-39

An isolated nucleic acid molecule having a nucleic acid sequence that is at least about 80% identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:35 or a fragment thereof having at least about 12 nucleotides; an canine or feline B7-2 protein encoded by said sequence, a therapeutic composition comprising it,a method to produce a canine or feline B7-2 protein ; a method to identify a compound capable of regulating T cell immune response in an animal using said protein; recombinant molecule, virus or cell comprising said nucleic acid molecule;, an isolated antibody that selectively binds to said protein.

3. Claims: 15, 24 and partially 1-13 16-20 22 23 25-31 33-39

An isolated nucleic acid molecule having a nucleic acid sequence selected from the group consisting of SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40 ; an feline B7-1 protein encoded by said sequence, a therapeutic composition comprising it,a method to produce a feline B7-1 protein ; a method to identify a compound capable of regulating T cell immune response in an animal using said protein; recombinant molecule, virus or cell comprising said nucleic acid molecule;, an isolated antibody that selectively binds to said protein.

4. Claims: Partially 1 2 4-14 16-19 26-28 37-39

An isolated nucleic acid molecule having a nucleic acid sequence that is at least about 90% identical to a nucleic acid sequence selected from the group consisting of SEQ ID

NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50 or a fragment thereof having at least about 12 nucleotides; an canine or feline CTLA4 protein encoded by said sequence, a therapeutic composition comprising it,a method to produce a canine or feline CTLA4 protein ; a method to identify a compound capable of regulating T cell immune response in an animal using said protein; recombinant molecule, virus or cell comprising said nucleic acid molecule;, an isolated antibody that selectively binds to said protein.